

IN THE CLAIMS

Please cancel without prejudice claims 36-50.

5 51. An article comprising:

a machine readable storage medium storing instructions comprising a device
manager and power management software, said power management
software, if executed by a system:

cooperates with said device manager to allow power management of a
plurality of devices in the system which are configurable devices;
and

manages a power level for each of the plurality of devices which in the
system and is capable of placing one or more of said plurality of
devices in a reduced power consumption state.

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52. The article of claim 51 wherein said power management software operates at a kernel
level of an operating system.

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20 53. The article of claim 52 wherein said device manager comprises a plug and play
manager.

³⁹ ³⁸
54. The article of claim 53 wherein said power management software comprises a power
manager that forms a part of a kernel of the operating system.

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55. The article of claim 53 wherein said power management software, if executed,
communicates with said plug and play manager to update data structures if
configuration changes occur to allow power management of dynamically
reconfigurable devices.

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56. The article of claim 51 wherein said power management software, if executed,
registers with said device manager to be notified of configuration changes.

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10 ~~57. The article of claim 55 wherein said power management software, if executed,
provides support for idle detection for at least one of said plurality of devices.~~

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58. The article of claim 51 wherein said power management software comprises a power
manager, said power manager, if executed, providing system level power
management including the use of multiple system level power management states for
15 said system, and providing multiple power management states for said plurality of
devices.

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59. The article of claim 51 wherein said power management software, if executed,
provides support for idle detection for at least one of said plurality of devices.

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60. The article of claim 55 wherein said power management software, if executed, places
the system in a sleep state when the system is idle and keeps said system in said sleep
state until activity is detected, and wherein the sleep state is one of a plurality of

system power management states, and further wherein said system stops a clock for a system processor in said sleep state.

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61. The article of claim 53 wherein said operating system, if executed, provides virtual
5 memory organization and multitasking operation.

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62. The article of claim 53 wherein said plurality of devices comprise:

an I/O device that is placed in a first reduced power consumption state by the
power management software if the I/O device is inactive for a first period
10 of time; and

a processor that is placed in a second reduced power consumption state by the
power management software if the system is idle for a second period of
time.

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~~63. The article of claim 51 wherein said power management software performs power
management for said plurality of devices and therefore has no permanent tie to one
specific hardware device in the system.~~

64. An article comprising:

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a machine readable storage medium storing power management software
which, if executed by a system,
coordinates power management for a plurality of devices; and
registers with a configuration manager to be notified of configuration

changes for any of said plurality of devices.

sub B2/ 65. The article of claim 64 wherein said power management software comprises a device driver that manages a power state for said plurality of devices..

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50 49 66. The article of claim 65 wherein said device driver, if executed, in response to a configuration change, examines its data structures to adapt to remapped system resources.

A/ 51 49 67. The article of claim 65 wherein said configuration manager is a plug and play manager.

52 48 68. The article of claim 64 wherein said power management software, if executed, alters data in a data structure in response to a configuration change to allow continued power management of said plurality of devices after said configuration change.

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sub B3/ 69. The article of claim 68 wherein said power management software, if executed, instructs the configuration manager to notify it when there has been the configuration change and wherein said power management software responds by updating data in said data structure in the same manner as when examining the data structure at system boot-up time.

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Sub C4/ 70. An article comprising:

a computer readable storage medium storing power management software
comprising a power manager and additional software which is operating
system software, the power management software, if executed by a
computer:

5 forms a part of a kernel level of an operating system for the computer;
cooperates with a device manager to allow power management of a
plurality of system devices after reconfiguration of said plurality of
system devices; and
manages a power level of the computer.

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A' 71. The article of claim 70 wherein said power management software, if executed by said
computer, provides support for idle detection for at least one of a plurality of devices.

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72. The article of claim 71 wherein said power management software provides support
15 for clock throttling of a system processor.

Sub 73. An article comprising:

20 a computer readable medium storing a plurality of computer executable
instructions including power management software and additional
software to implement a Microsoft Windows operating system, the power
management software, if executed by a computer system, operates in an
operating system cooperative manner with said Microsoft Windows
operating system at a kernel level which is a highest privilege level of the

Microsoft Windows operating system, and causes the computer system to perform:

providing support for device idle detection for an input/output device

in said computer system to determine when said input/output

device has been inactive for a first duration, the first duration being

a user configurable duration that may be varied based on desired

power savings using a graphical user interface;

placing said input/output device in a reduced power consumption state

if said input/output device has been inactive for the first duration;

cooperating with a plug and play manager that, in cooperation with

said power management software, allows power management of

said input/output device even though said input/output device is a

plug and play configurable device;

providing support for system level power management by monitoring

global events;

placing said computer system into one of a plurality of system level

power management states as a part of system level power

management implemented by said power management software,

one of said plurality of system level power management states

being a sleep state into which the computer system is placed due to

the system remaining idle.

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74. A method comprising:

monitoring, using power management software, a power level of a plurality of devices in a system;

detecting an inactive device;

placing one of said plurality of devices in a reduced power consumption state due to detected inactivity;

performing system level power management using said power management software; and

allowing continued power management of devices after device reconfiguration.

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A1 75. The method of claim 74 wherein allowing comprises communicating with a device manager to update data structures if configuration changes occur.

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76. The method of claim 75 wherein the device manager comprises a plug and play manager.

⁶¹ ⁵⁸
77. The method of claim 74 further comprising:

programming a first duration of inactivity required to place one of said plurality of devices in said reduced power consumption state based on desired power savings.

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78. The method of claim 74 wherein performing system level power management comprises:

placing said system in a sleep mode that stops a clock to a system processor
until system activity is detected.

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79. The method of claim 74 wherein said power management software operates at a

5 kernel level of an operating system for the system and wherein said power
management software cooperates with operating system routines in performing
system power management.

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80. A method comprising:

10 coordinating power management for a plurality of devices;
registering with a configuration manager to be notified of configuration
changes for any of said plurality of devices.

81. The method of claim 80 wherein a device driver for said plurality of devices controls

15 a power state for said plurality of devices performs coordinating and registering.

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82. The method of claim 80 wherein said configuration manager is a plug and play
manager.

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20 83. The method of claim 80 further comprising:

altering data in a data structure in response to a configuration change to allow
continued power management of said plurality of devices after a
configuration change.

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84. The method of claim 81 further comprising:

instructing the configuration manager to notify the device driver when there

has been a configuration change; and

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responding to notification by updating data in a data structure in the same

manner as when examining the data structure at system boot-up time.

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85. The method of claim 80 wherein said power management software operates at a

kernel level of an operating system for the system and wherein said power

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management software cooperates with operating system routines in performing power

management.

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86. A system comprising:

a bus;

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a plurality of devices coupled to said bus, the plurality of devices being

configurable devices, the system being capable of reconfiguring said plurality

of devices;

a memory containing a device manager and power management software which, if

executed by the system, cooperates with said device manager to allow power

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management said plurality of devices in the system and manages a power level

of said plurality of devices.

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87. The system of claim 86 wherein the plurality of devices are plug and play

configurable devices.

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88. The system of claim 86 wherein said plurality of devices comprises:

an I/O device; and

5 a processor.

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89. The system of claim 86 wherein said power management software, if executed,

provides support for idle detection said plurality of devices.

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10 90. The system of claim 88 wherein said power management software, if executed,

places said I/O device in a reduced power consumption state if said I/O device is

inactive for a first duration.

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91. The system of claim 90 wherein said power management software, if executed, places

15 said processor in a reduced processor power consumption state if said system is

inactive for a second duration.

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92. The system of claim 90 wherein the power manager operates at a kernel level of an

operating system for the system, and wherein said device manager comprises a plug

20 and play manager.

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93. The system of claim 92 wherein said power management software, if executed,

communicates with said plug and play manager to update data structures if

configuration changes occur to allow power management of dynamically
reconfigurable devices.

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94. A system comprising:

5 a device;

a processor;

a memory containing power management software which, if executed by said
system

coordinates power management for a plurality of devices; and

10 registers with a configuration manager to be notified of configuration

changes for any of said plurality of devices.
